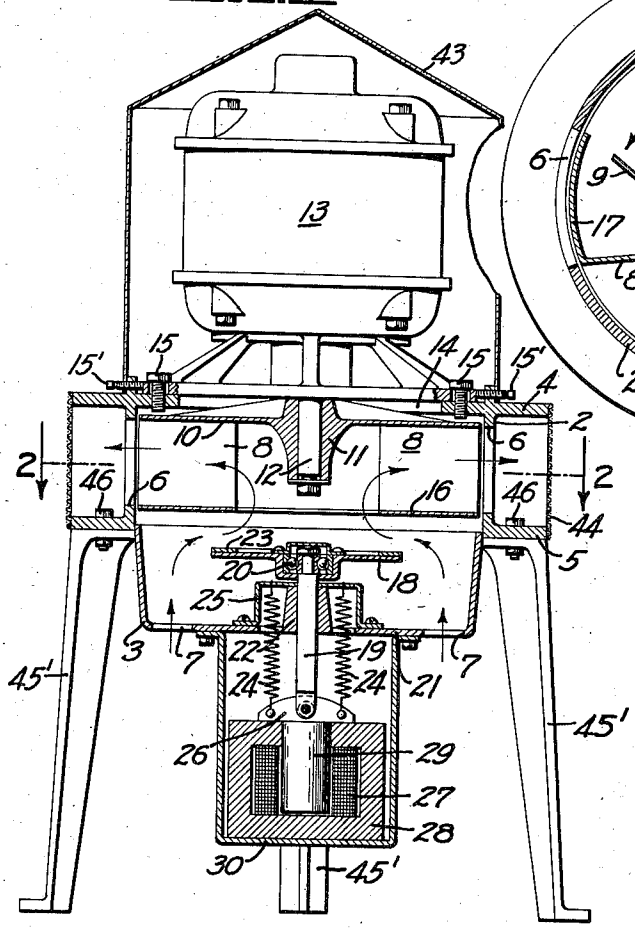
March 16, 1937. J. B. HARRIS, JR., ET AL 2,074,263

SIGNAL DEVICE

Filed Sept. 17, 1934

FIG. 1



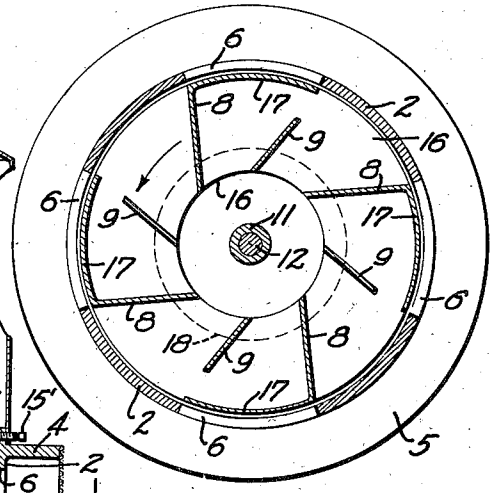
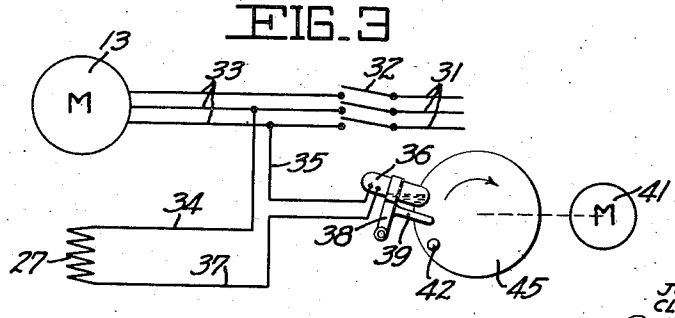


FIG. 2

FIG. 3



INVENTORS
JUNIUS B. HARRIS, JR.
CLARENCE B. BOWMAN
BY Charles O. Bruce
THEIR ATTORNEY.

Patented Mar. 16, 1937 2,074,263

UNITED STATES PATENT OFFICE

2,074,263

SIGNAL DEVICE

Junius B. Harris, Jr., and Clarence B. Bowman,
Berkeley, Calif.

Application September 17, 1934, Serial No. 744,361

1 Claim. (Cl. 177—7)

Our invention relates to signal devices, and particularly to sound signaling apparatus, commonly known as sirens, for producing sound signals of characteristic pattern.

An important object of our invention is the provision of a compact and durable device for producing sound signals, and which may be readily and economically manufactured.

Another object of our invention is the provision of a device, of the character described, having an improved coding structure.

A further object of our invention is to provide a signal device of the character described, wherein all moving parts are enclosed.

An additional object of our invention is to provide a signal device of simple construction.

Another object of our invention is to provide a device, of the character described, having a minimum number of bearings and moving parts.

Another object of our invention is to provide an improved method of sound signaling.

Our invention possesses numerous other objects and features of advantage, some of which, together with the foregoing, will be apparent or will be specifically pointed out in the following description forming a part of this specification, but we do not limit ourselves to the embodiment of the invention herein illustrated, as various forms may be adopted within the scope of the claim.

Referring to the drawing:

Figure 1 is a longitudinal view, partly in section, of one embodiment of our invention.

Figure 2 is a horizontal sectional view looking in the direction of the arrows 2—2 of Figure 1.

Figure 3 is a schematic diagram, reduced to lowest terms, of the electrical connections between the various parts of the device.

Broadly stated, our invention comprises a cylindrical casing having a plurality of inlet and outlet ports in the walls thereof. Means is provided for moving an air current over a defined course and through said ports in successive surges to produce sound waves at an audible frequency. This means preferably comprises a rotor mounted for rotation in the casing and having vanes for moving the air current and rapidly interrupting the same. Means, preferably a valve, is also provided for instantaneously interrupting said air current at predetermined time intervals. We prefer that this measured interruption of the air current shall be made at or near the start of its course through the casing and that the same shall be instantaneous so as to provide a characteristic sharp blast rather than a wail.

In greater detail and with reference to the preferred construction illustrated by the drawing, our device comprises a casing or housing of cylindrical shape and preferably of cast construction, formed by an upper section 2 and a lower section 3. The upper section is provided with a pair of oppositely disposed outturned annular flanges 4 and 5 and a plurality of circumferentially spaced outlet ports 6, while the lower section 3 of the casing is formed with a plurality of inlet ports 7, thus providing for the passage of air to and from the casing.

Means are provided for moving a current of air through the inlet and outlet ports of the casing. This means is preferably positioned in the upper section 2 of the casing and preferably comprises a plurality of substantially radially disposed vanes 8 and auxiliary vanes 9 carried by the wheel plate 10 formed on hub 11. This hub is removably mounted on and rotatable with the armature shaft 12 of a motor 13, which is positioned on top of the casing and secured to the apertured end 14 thereof by means of the bolts 15. Secured to the lower edges of vanes 8 and 9 a centrally apertured plate 16 is provided, which forms a partition between the two sections of the casing.

Means are provided for rapidly interrupting the flow of air, made by movement of the vanes, to create sound waves at an audible frequency. This means comprises a plurality of shutters 17 preferably disposed on the outer edges of vanes 8 and of such size as to fully span the outlet ports 6 of the casing and block the flow of air current therethrough. It will be observed that the vanes 8 and 9, shutters 17, plates 10 and 16 and hub 11 form a unitary rotary structure which is supported by and rotatable with the armature shaft 12 of the motor, and that when this structure is revolved in a counter-clockwise direction as shown by the arrow in Figure 2, the air current created by movement of the vanes flows along a path indicated by the direction of the arrows shown in Figure 1. It is thus apparent that the flow of the air current through outlet ports 6 will be rapidly interrupted in successive sequence by the shutters 17 and sound waves of an audible frequency produced.

With continued use the rotor structure, due to wear in the motor bearings, is apt to shift so as to strike the walls of the casing. Therefore, to overcome this condition, means are provided for re-centering the rotor, which comprises a plurality of set screws 15' threaded in suitable lugs formed on the top end of the casing and adapted to bear against the flanged base of the motor.

In order to permit slight lateral movement of the motor and rotor structure, the apertures in the motor flange through which bolts 15 pass are elongated or otherwise enlarged.

It is desirable in signaling devices of the character to which our invention pertains that the signal be coded and for this purpose we provide means for interrupting the flow of air current at measured intervals. This means preferably comprises a disk valve 18 journaled for rotation on shaft 19 preferably by means of a ball bearing 20. The end wall 21 of the bottom section of the casing is formed with an inwardly projecting hub 22 forming a bearing in which shaft 19 is journaled for slidable movement. We prefer that the valve and shaft shall be concentrically positioned with reference to the axis of rotation of the rotor structure so that the valve may be moved into engagement with the plate 16 to close the aperture therein, and, in order to minimize the leakage of air between the abutting surfaces of the disk valve and partition plate 16, we provide the face of the valve with an annular gasket 23.

We wish to point out that the flow of the air current through the casing follows a definite path and that such flow is interrupted for coding purposes near the beginning of the flow and prior to the time it enters the rotor structure. This makes possible the use of a simple and lightweight coding valve, reduces the number of bearings to a minimum, permits the instantaneous interruption of the air flow thereby producing a characteristic blast signal instead of the familiar wail of the common siren, and makes possible the transmitting of a distinct signal at a very high rate of speed.

Disk 18 is preferably held in normally closed position by means of the springs 24 which extend through the bottom end 21 of the casing. Each spring is attached at one end to the bottom of an inverted cup-shaped housing 25 which is suitably secured to the casing, and the other end is attached to a cross arm 26, pivotally connected to the shaft 19. It will be observed that the tension of the springs will raise the cross arm and shaft, thereby normally maintaining the valve in closed position.

Means are provided for opening the valve 18, which preferably comprises a solenoid formed of the windings 27, field core 28 and armature 29 which is secured to the cross arm 26 of shaft 19, and this structure, for the purpose of protection as well as support, is enclosed in a cylindrical housing 30 secured to the bottom of the casing. It is to be noted that upon energizing the solenoid the armature 29 assumes the position shown in Figure 1, whereby the valve 18 is opened thus permitting the vanes to reestablish the flow of the air current.

Referring to Figure 3, it will be seen that current is supplied from a power line 31 to motor 13 through the disconnecting switch 32 and leads 33. For energizing the solenoid, two of the leads 33 are tapped by the lines 34 and 35. Line 34 taps a neutral lead and connects directly with the windings 27 of the solenoid, while line 35 taps a "hot" lead and is connected through the medium of a mercury switch 36 and line 37 to the solenoid windings 27.

The mercury switch 36 is supported by a pivotally mounted arm 38 having a trip finger 39. A disk 40 is provided and the same is adapted to be rotated by a motor 41, preferably of the synchronous type such as used in electric clocks and the like. The disk 40 is provided with a lug 42 which is adapted to lift the finger 39, upon rotation of the disk, thereby actuating the switch 36. The proportions of the arm 38 are such that after it has been moved by the lug 42 to close the switch, and the lug has passed beyond the finger 39, the arm will return by gravity to its position wherein the contact in the mercury switch is broken. If desired, a spring may be connected to the arm to hasten the return thereof to the "off" position. It is obvious that by regulating the speed of rotation of disk 40, the operation of the switch may be controlled to effect desired coding intervals.

Signal devices of the type here described are ofttimes used in the open for fog signaling and are, therefore, subjected to the destructive action of the elements. It, therefore, becomes desirable to protect the vital parts from corrosion and for this purpose we enclose the motor 13 in a hood 43 which is suitably secured to the top of the casing, while the solenoid and springs, as heretofore pointed out, are likewise completely enclosed by suitable housings 25 and 30. Also, to guard against injury to the rotor structure by reason of the entry of foreign matter through the outlet ports 6, a screen 44 is provided, which is suitably secured to the peripheries of the flanges 4 and 5, completely spanning the space therebetween. Furthermore, the entire device is suitably mounted on legs 45' which are secured to flange 5 by means of the bolts 46.

We claim:

A signal device comprising, in combination, a cylindrical casing having peripherally disposed outlet ports, a rotor axially mounted in said casing for rotation therein, said rotor having vanes thereon for forcing a flow of air through said ports and for interrupting said flow periodically to create sound waves at an audible frequency, an end plate on said rotor having an air inlet aperture therein in axial alinement with the axis of rotation thereof, a non-rotatable shaft mounted concentrically with said rotor and movable axially thereof, a disk valve rotatably mounted on said shaft in alinement with said aperture, resilient means for holding said valve in engagement with said end plate to close said aperture, and electromagnetic means for moving said shaft and said disk out of engagement with said end wall to open said aperture.

JUNIUS B. HARRIS, JR.
CLARENCE B. BOWMAN.